

REMARKS

1. Claims 1-28 were pending. Claims 1-3, 5-7, 10-13, 15, 16, 20, 22-24, 27, and 28 have been amended. Claims 36-45 have been added. Claims 1-28 and 36-45 are now pending. Reexamination and reconsideration of the application, as amended, are requested.

2. Rejection under 35 U.S.C. § 103(a)

Claims 1-28 were rejected in the Office Action under 35 U.S.C. § 103(a) as being unpatentable over various references. All of the rejections applied Madokoro (US Patent No. 4,997,518) and other references of record. The Applicant respectfully traverses the rejections and requests consideration of the following.

A. Madokoro Teaching About An Al Alloy Film and An Anti-reflective Film

Madokoro teaches a method for filling a contact hole in a semiconductive wafer. The wafer has an intermediate insulating film with the contact hole formed therein. An Al alloy film serves as a wiring metal film that is formed over the intermediate insulating film and the contact hole. The method requires that an anti-reflective film be formed on the Al alloy film. A laser beam is used at a particular ultraviolet wavelength to irradiate the semiconductive wafer. Madokoro teaches that the purpose of the anti-reflective film is to prevent the reflection of light. At Col. 5, lines 14-18, Madokoro indicates that the purpose of the light reflection prevention film is to increase the light absorption of the Al alloy film:

"As will be apparent from the foregoing, since an anti-reflective film is formed on an Al alloy film, the light absorption efficiency of the Al alloy film is improved, making it easy to give a beam size larger than a chip size. "

B. The Al Alloy Film and Is 7.5 to 30 times Thicker Than the Anti-reflective Film

Figure 3 of Madokoro shows a graph of light reflectance in relation to the variation in thickness of the anti-reflective film. Madokoro teaches that the Al alloy film can have a thickness of 0.6 microns, or about 6000 angstroms, while the anti-reflective film has a thickness of not less than 20 nm, for example, in a thickness of 300 angstroms (Col. 3, lines 31-34). When taken with Figure 3, Madokoro teaches that the anti-reflective or light reflection preventive film has a thickness in a range from 20-80 nm or between 200 and 800 angstroms. As such, Madokoro's Al film is 7.5 to 30 times thicker than the anti-reflective film.

C. Madokoro's Al Alloy Film Has Much More Mass than the Anti-reflective Film

The foregoing significant thickness difference implies a significant difference in mass between the Al film and the antireflective film. Stated otherwise, Madokoro's anti-reflective film lacks the thermal mass of the Al film as implied by the 7.5 to 30 times difference in thickness. Since Madokoro's anti-reflective film and the Al film are both composed of a metal or metal compound, this relative mass difference in metals means that the anti-reflective film will not have the capacity to absorb more heat than the Al film. Between the two films, the low mass anti-reflective film will inherently have less ability to absorb heat (e.g. less thermal absorption capacity) than that of the higher mass Al film.

D. Madokoro Focuses On Light absorption Efficiency, Not Heat Absorption

It is important to note that while Madokoro teaches light absorbsion efficiency, Madokoro does not provide a teaching of thermal absorption, and Madokoro is silent as to the relative difference in thermal absorption capacity between the Al alloy film and the light reflection prevention film. This silence is understandable in that Madokoro's objective is light

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183.85

absorption efficiency of the Al alloy film rather than and thermal absorption capacity of the anti-reflective film. The only function of Madokoro's anti-reflective film is to maximize light at a particular ultraviolet wavelength that will be transmitted to the Al alloy film, while minimizing the reflection of this UV light. Madokoro is not concerned with the thermal absorption capacity of the anti-reflective film.

E. The Claimed Invention Focuses Upon Heat Absorption Capacity

The claimed invention is particularly directed towards the thermal absorption capacity of an energy absorbing layer. Light transmission or reflectance is not at issue or of concern. The ability of the energy absorbing layer to absorb heat must be greater than the ability of the electrically conductive layer to absorb energy. The effect of the claimed invention is supported by the specification at least at Page 12, line 23 through Page 13, line 2 wherein it is stated:

[t]he temperature of the conductor is held high for at a longer period of time while underlying or overlying materials retain thermal energy. The formation of energy absorbing layer 30 on conductor layer 28 substantially retains thermal energy under an interfacial surface of energy absorbing layer 30 so that the thermal energy can diffuse into conductor layer 28."

F. Contrasting Light Transmission and Heat Absorption

In making the obviousness rejection the Office Action makes a factual statement at pages 3 and 4:

"since the energy absorbing layer of Madokoro has a higher light absorption capacity than the electrically conductive layer, the energy absorbing layer would thus also have a higher heat absorption capacity than the electrically conducting layer."

The Applicant traverses the foregoing factual statement and respectfully submits that anti-reflective is the capability to transmit light. Madokoro's anti-reflective film will not necessarily absorb more heat than the Al film. While different materials allow different wavelengths of electromagnetic radiation (e.g. light) to pass therethrough, materials are not equivalently selective as to their ability to absorb heat. The foregoing quotation at Pages 3 and 4 of the Office Action is erroneous in that it presumes that any material capable of transmitting light will have an equivalent ability to absorb heat.

G. Absence of Support For Factual Statement

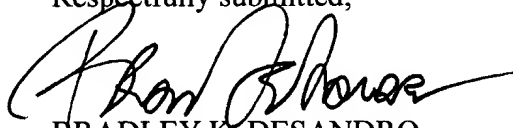
The foregoing quotation at Pages 3 and 4 of the Office Action is not supported by the teachings of Modokoro or the other applied art. Moreover, the factual statement is not otherwise supported by way of prior art citation, official notice, stated scientific theory, basis for common knowledge in the art, or cited legal precedent. As such, the rejection fails to give proper weight to the claimed thermal absorbsion capacity limitation. Because the foregoing factual statement, upon which the obviousness rejection relies, has an absence of support the Applicant respectfully submits that the obviousness rejections are to be withdrawn as to the pending claims, each of which recites this limitation.

3. In sum, the Applicant respectfully submits that, as to the claims now pending, a *prima facie* case of obvious has not been made out, or in the alternative, the pending claims avoid the rejections. As such, the Applicant respectfully maintains that the present application is in condition for allowance. Reconsideration of the rejections is requested. Allowance of Claims 1-28 and 36-45 at an early date is solicited. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application which could be clarified by a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned

attorney.

Dated this 26 day of August, 1999.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Bradley K. Desandro", written over a horizontal line.

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